

# OBECO GLASS BLOCKS **SPECIFICATION**

# INSTALLATION OF GLASS BLOCKS

## 1 SCOPE

This specification covers the supply and installation of Obeco glass blocks and associated materials. Specific requirements will be as detailed in the contract drawings, the schedule of work and the purchase order.

## 2 REFERENCED STANDARDS, DOCUMENTS AND DRAWINGS

### AS

1231 – 2000, Aluminium and aluminium alloys – Anodic oxidation coatings  
1449 – 1994, Wrought alloy steels – Stainless and heat-resisting steel plate, sheet and strip  
1530 Methods for fire tests on building components, materials and structures,  
1530.4 – 1990, Part 4: Fire resistance tests of elements of building construction  
2758 .1 – 1998, Aggregates and rock for engineering purposes, Part 1: Concrete aggregates,  
3715 – 1989, Metal finishing – Thermoset powder coatings for architectural applications  
3700 – 2001, Masonry structures  
3972 – 1977, Portland and blended cements  
4671:2001, Steel reinforcing materials

### AS/NZS

1866:1977, Aluminium and aluminium alloys – Extruded rod, bar solid and hollow shapes.  
4534:1998, Zinc and zinc-aluminium-alloy coatings on steel wire.

### AS/NZS ISO

9001:2000, Quality management systems – Requirements

### DIN (German Standard)

18175 Glass building bricks and blocks – Requirements, test methods

### OBECO

Obeco Glass Block Coursing Charts  
Obeco Glass Block Technical Manual  
Obeco Glass Block Drawings

## 3 CONTRACT DRAWINGS

The Builder shall supply drawings, details and specifications of sufficient detail to define the extent and location of the work.

When detailed drawings or schedules are required to execute the work, copies of these detailed drawings or schedules shall be submitted to the Builder by the contractor, for approval before the work commences.

## 4 DIMENSIONS AND SET-OUT

All work shall be installed in accordance with the contract drawings, which show the general layout. The main building dimensions shown on the architectural drawings take precedence over those shown on the engineering drawings, which have been included to assist the detailing.

Dimensions for straight glass block panels in all block sizes and frame options using standard 10mm joints, are as specified in the Obeco Glass Block Coursing Charts. Joint sizes can be varied up to 30mm. Curved and corner glass block panels should be set out on site. Minimum radii for curved panels are as specified in Obeco Drawing No.08.

## 5 SUPERVISION

The contractor shall ensure that the work is performed and directly supervised by appropriately experienced personnel.

NOTE: Glass Block Experts Pty Ltd, a wholly owned subsidiary of Obeco Glass Blocks Pty Ltd is an installation contractor that is deemed to comply with these requirements.

## 6 QUALITY ASSURANCE

Suppliers and contractors shall provide assurance of the quality of all goods, materials and services to be provided. The following are deemed to meet this requirement:

- a quality assurance system complying with AS/NZS ISO 9001, or
- a quality control system approved by the Builder.

## 7 COMMENCEMENT

### 7.1 Builder

Work shall commence as soon as practical after, but not before, the Builder has issued:

- a written order;
- the relevant contract drawings, specifications and schedule of work; and
- written approval of any details provided by the Contractor.

### 7.2 Openings

Openings need to be prepared with correct flashing and lintels to suit glass block installation. This work is not the responsibility of the glass block installer. Sizing of openings shall allow enough clearance to accommodate the frame sizes as set out in the Obeco Coursing Charts.

### 7.3 Access

The Builder shall provide adequate and safe access to both sides of the panels.

## 8 INSPECTION AND COMPLETION

Glass block installation shall be inspected after the first course of the first panel is completed. The inspection shall verify that the following are correct and to the specification:

- the fixing of the frame;
- fitting of expansion joints to the jambs and head; and
- installation of reinforcement.

When work has reached this inspection stage, the Contractor shall advise the Builder before covering, closing or completing the work.

On completion of all works, the Contractor shall formally advise the Builder of practical completion. Where the contract is staged, this advice shall be given on completion of each major stage.

## 9 MORTAR JOINTED PANELS

### 9.1 Glass blocks

Obeco glass blocks shall be used for compliance with this specification, Obeco Glass Blocks are manufactured by SOLARIS®, by WECK® Glass Blocks and MULIA® Glass Blocks.

SOLARIS® AND WECK blocks shall comply with German standard DIN 18175

Damaged or imperfect blocks shall not be used.

Glass block panels are not load-bearing and adequate provision for support must be made around the panel.

Glass blocks shall be stored in a dry place, in their protective packing until required for installation. Care shall be taken in handling to avoid damage to edges or chipping.

## 9.2 Aluminium frames

Glass block panels shall be supported on all sides by fabricated aluminium frames of nominal dimensions 80 x 40 x 2.2mm. Aluminium frames shall not be load-bearing and shall be fixed to the jambs of the surrounding structure at maximum 450mm centres. Fixing materials and methods shall be compatible with the surrounding material.

Aluminium shall comply with AS/NZS 1866.

Powder coated aluminium frames shall comply with AS 3715. The finished paint thickness shall be not less than 65µm.

Anodised aluminium frames shall comply with AS 1231. The anodised coating shall be 15µm unless otherwise specified.

## 9.3 Reinforcement

Steel reinforcement shall be nominal 6mm mild steel in accordance with AS 4671.

Reinforcing rods shall be placed in pairs at maximum 600mm centres both vertically and horizontally (see Obeco Drawing No.01).

Where possible, reinforcement shall be continuous in the shortest span. Where it is necessary to join reinforcement, the lap shall be a minimum length of 500mm.

Reinforcing shall be laid into the perimeter mortar bed (inside the frame) on all sides. All vertical and horizontal reinforcing shall overlap the perimeter reinforcing.

Horizontal reinforcing that bridges an expansion joint shall overlap the joint 500mm to either side and shall be encased in a plastic sleeve to allow free movement.

Mortar cover to reinforcement shall be 15mm minimum external and 10mm minimum internal. Reinforcement shall not be in contact with glass blocks at any location.

In all areas except for a "severe marine environment" as defined by AS 3700, all steel reinforcement shall be treated with a protective coating in accordance with AS/NZS 4534. Coating mass (min) 290g/m<sup>2</sup>.

In a "severe marine environment" stainless steel grade 316 or 316L to AS 1449 shall be used. (See Obeco Technical Manual for further information on exposure environments).

## 9.4 Mortar

Cement shall be slow setting Portland cement with low shrinkage, complying with AS 3972 unless specified otherwise.

Sand shall be clean, sharp and free from salts, vegetable matter and impurities. It shall conform to AS 2758.1, with a grain size of 0-4mm. (See Obeco Technical Manual for full grading).

Water shall be clean and potable.

Mortar shall be a stiff, homogenous mix of 1 part cement to 3 parts sand, mixed as dry as practicable.

Anti-freeze and accelerators shall not be used.

For external applications, add a stearate waterproofing agent (Waterblock 300 or equivalent) at a ratio of 550ml to 20kg of cement. The waterproofing agent shall be added to the mixing water for even dispersion.

The minimum compressive strength shall be 12Mpa at 28 days.

## 9.5 Mortar joints

Joints shall be equal thickness. Standard joint thickness is 10mm.

Joints shall be raked to 10mm for grout. Joints at top, bottom and vertical edge of each panel (between glass block and framing) shall be recessed to 10mm for a silicone perimeter joint.

## 9.6 Expansion joints and slip joints

Expansion material shall be closed cell waterproof type, nominal 10mm thick and shall be installed into the jamb and head of the perimeter framing. Separating membrane shall be placed in the sill and on the inside flanges of the framing on all sides.

Vertical expansion joints shall be located at a minimum 6 m intervals horizontally.

Horizontal slip joints shall be located at a minimum 6m intervals vertically.

Details are provided in Obeco Drawing No.09.

## 9.7 Grout

Grout shall comply with the appropriate standards for mortar listed in 10.4 and shall comprise:

- 3 parts 30 micron mineral sand, soda ash or silica type
- 1 part cement
- 1 part pure silica
- 550ml Stearate per 20kg cement (mixed the same as for mortar)

Iron joints smooth and clean off excess grout.

When grout has dried, use a dry cloth to remove the light film remaining. Keep the cloth clean of sand particles to avoid scratching.

## 9.8 Maintenance

Powder coated and anodised aluminium should be cleaned regularly with a pH-neutral detergent solution (see AS 3715 and AS 1231) and thoroughly rinsed. Solvents or abrasive solutions should not be used. Full details are provided in the Obeco Technical Manual.

Do not use harsh cleaners, acids or abrasives.

# 10 FIRE RATED PANELS

## 10.1 General

Fire-resistant glass structures are usually made of one or more transparent space-enclosing elements in conjunction with seals and fastening elements. When they function as a space enclosing elements, they need to prevent the spread of fire and smoke for the nominated period of time.

Glass blocks used in fire-resistant glass structures are not load-bearing, however they offer great versatility where fire protection is required, but where natural light and/or transparency are desirable.

Fire-resistant glass blocks can be used in the following situations:

- To provide fire protection in emergency escape routes.
- To provide fire protection on boundary walls.
- To provide fire separation between floors.

Fire Resistance Levels (FRLs) are expressed in terms of:

- **Structural adequacy** The capacity of the element to resist failure, collapse or major damage;
- **Integrity** The capacity to resist the formation of cracks, fissures and the like; and
- **Insulation** The capacity to keep the temperature on the external face within specified limits

These properties are measured in minutes and expressed as xx/yy/zz. See Technical Data Figure 1 in the Obeco Technical Manual for FRLs of different glass blocks.

## 10.2 Fixing for Integrity Rated Glass Blocks

This work instruction covers glass block installation to achieve FRLs of -/60/- (see clause 10.3) and -/90/- (see clause 10.4). The standard details set out in clauses 1 to 9 above apply, except where modified below.

In both instances, the maximum overall panel size is 9m<sup>2</sup>, with a maximum height of 3.5m and a maximum width of 6m.

Modifications to standard fixing details are as follows:

- a) **Frames** To be in accordance with clause 9.2, except for the addition of steel anchor pins at 600mm centres from the glass block joint (150mm depth) into the jambs of the surrounding structure (50mm depth). Refer to Obeco Drawing No.03.
- b) **Reinforcing** To comprise two 6mm nominal diameter rods in each horizontal joint and one in every second vertical joint, its position changing between inside and outside. Refer to Obeco Drawing No.02.
- c) **Cross spacers** Are not to be used in fire rated glass block construction.
- d) **Expansion material** To be compressible fire-approved type.

### 10.3 FRL -/60/-

When installed in accordance with this specification, including clause 10, all SOLARIS® 190 x 190 x 80mm (Solaris 198) glass blocks with a nominal face thickness of 8mm would be capable of achieving a FRL of -/60/- when tested in accordance with the requirements of AS 1530.4. (see CSIRO Opinion Number FCO-2115).

### 10.4 FRL -/90/-

When installed in accordance with this specification, including clause 10, all SOLARIS® 190 x 190 x 80mm (Solaris 198 BSH20) glass blocks with a face thickness of 20mm would be capable of achieving a FRL of -/90/- when tested in accordance with the requirements of AS 1530.4. (see CSIRO Opinion Number FCO-1833).

### 10.5 Fixing for Integrity and Insulation Rated Glass Blocks

This work instruction covers glass block installation to achieve FRLs of -/60/60 (see clause 10.6) and -/90/90 (see clause 10.7). The standard details set out in clauses 1 to 10 above apply, except where modified below.

In both instances, the maximum overall panel size is 9m<sup>2</sup>, with a maximum height of 3.5m and a maximum width of 6m.

Modifications to standard fixing details are as follows:

- a) **Frames** To be in accordance with clause 9.2, except that the framing shall be 160 x 40 x 2.2mm, and the addition of steel anchor pins at 600mm centres from the glass block joint (150mm depth) into the jambs of the surrounding structure (50mm depth) as per clause 10.2.
- b) **Reinforcing** To comprise three 6mm nominal diameter rods in each horizontal joint and two in every second vertical joint, their position changing between inside and outside. Reinforcing of the mortar in the perimeter framing to be three 8mm nominal diameter rods on all sides.
- c) **Cross spacers** Are not to be used in fire rated glass block construction.
- d) **Expansion material** To be compressible fire-approved type.

### 10.6 FRL -/60/60

When installed in accordance with this specification, including clause 10, all SOLARIS® 190 x 190 x 160mm (Solaris 1960 F) glass blocks would be capable of achieving a FRL of -/60/60 when tested in accordance with the requirements of AS 1530.4. (see CSIRO Opinion Number FCO-1835).

### 10.7 FRL -/90/90

When installed in accordance with this specification, including clause 10, all SOLARIS® 190 x 190 x 160mm (Solaris 1990 F) glass blocks would be capable of achieving a FRL of -/90/90 when tested in accordance with the requirements of AS 1530.4. (see CSIRO Opinion Number FCO-1836).